

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Double-Walled Hollow Structure for the Reception of Highly Heated Media under Pressure for Thermal Power Plants

We, AKTIENGESELLSCHAFT FÜR TECHNISCHE STUDIEN, of 319 Hardstrasse, Zurich, Switzerland, a Swiss Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a double-walled hollow structure for the reception of a highly heated medium under pressure for thermal power plants, which structure includes between its two walls a space through which a cooling medium flows and has associated with its outer wall a plurality of pipe junctions for the connection of pipes with its hollow interior, in accordance with claim 1 of patent No. 641,036.

In accordance with claim 1 of Patent No. 641,036 each of the pipe junctions of such a hollow structure is provided with an arrangement of hollow or tubular members, so disposed one within another in co-axial relation to the corresponding pipe junction as to provide annular ducts which serve as guide passages for a portion of the cooling medium supplied to the intermediate space between the two walls of said double walled structure, whereby the transmission of heat to the pipe junction from the highly heated medium flowing through the innermost of the hollow members therein is to a large extent prevented.

Double-walled hollow structures of this type are employed in thermal power plants, for example, as collectors for the working medium which flows from a heater in a number of tubes and is to be fed to the turbine. The double-walled structure must then be adjoined by a double-walled tube to establish the connection to the turbine.

Such double-walled tubes, however, are costly to produce and occupy a great amount of space. The invention has for its object both to reduce the cost of installing a thermal power plant comprising a double-walled structure of the type described and to afford the possibility of a compact arrangement of the whole installation, which is particularly important when

only a limited space is available, as in ships.

According to the invention this is achieved by reason of the fact that, in a double-walled structure according to claim 1 of Patent No. 641,036 which serves to collect gaseous driving medium to be fed to the turbine of a thermal power installation, the outer wall is at least partly formed by the inlet branch of the turbine housing itself and the hollow interior of the structure forms the inlet chamber of the turbine.

A compact construction is obtained especially if the driving medium compressor of the thermal power plant is assembled together with the turbine in the same housing. The assembly is then preferably so constructed that the intermediate space between the two walls of the double-walled structure forms an outlet chamber for this driving medium compressor, at least a part of the driving medium delivered by the compressor flowing through this intermediate space as cooling medium.

A constructional example of the subject of the invention is illustrated in axial longitudinal section in the accompanying drawing in combination with the power unit consisting of a turbine and compressor in a thermal power plant operating with gaseous driving medium.

The turbine comprises an outer housing 1, an inner housing 3 separated therefrom by heat insulating material 2 and a rotor 5 made in one piece with a common turbine and compressor shaft 4. The shaft 4 is mounted in two bearings 6 and 7. The turbine housing comprises an inlet branch 8 and an outlet branch 9. A cowl 11 provided with pipe junctions 10 is flanged to the inlet branch 8.

The inlet branch 8 and the cowl 11 combine to form the outer wall of a double-walled structure, the inner wall of which is formed by a double-walled hollow body 12 having an inter-layer of heat-insulating material surrounding an internal hollow space 13. This hollow interior forms at the same time the inlet chamber of the turbine. The branch 8 and the outer wall of the body 12 define between them an intermediate space 14.

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Highly heated driving medium is passed through the pipe junctions 10 by means of throughflow pipes 15 into the interior of the double-walled structure. Disposed within each of the pipe junctions coaxially in relation thereto, are two hollow members 16 and 17 which define between them spaces 18. The highly heated driving medium flows through the innermost hollow member 16 and thus enters the hollow internal space 13 of the structure and consequently the turbine.

The driving medium compressor of the thermal power plant is assembled with the turbine in the same housing 1. The still cold driving medium is sucked in from the left and flows successively through three compressor impeller wheels 19, 20, 21 of radial type.

After leaving the last compression stage, the driving medium enters the intermediate space 14 between the two walls of the double-walled structure. This intermediate space forms the outlet chamber of the driving medium compressor. The driving medium delivered by the compressor flows through the space 14 as cooling medium, whereafter it passes partly directly through an aperture 22 into a discharge pipe 23.

The remainder of the cooling medium is compulsorily guided through the intermediate spaces 18 defined by the hollow members 16 and 17, whereafter it enters the discharge pipe 23. Heat transfer from the highly-heated medium flowing through the innermost hollow elements 16 in the branches to the associated branch tubes is thus substantially avoided.

What we claim is:—

1. A double-walled hollow structure for the reception of a highly heated gaseous driving

medium under pressure which is to be fed to the turbine of a thermal power plant, which structure includes between its two walls a space through which a cooling medium flows and has associated with its outer wall a number of pipe junctions for the connection of pipes with its hollow interior, whereby each of the pipe junctions of said hollow structure is provided with an arrangement of hollow or tubular members, so disposed one within another in co-axial relation to the corresponding pipe junction as to provide annular ducts which serve as guide passages for a portion of the cooling medium supplied to the intermediate space between the two walls of said double-walled structure whereby the transmission of heat to the pipe junction from the highly heated medium flowing to the innermost of the hollow members therein is to a large extent prevented, in which the outer wall is at least partly formed by the inlet branch of the turbine housing itself, and the hollow interior of the structure forms the inlet chamber of the turbine.

2. A double-walled structure according to claim 1, in which the intermediate space between the two walls forms an outlet chamber of a driving medium compressor assembled with the turbine in the same housing in the thermal power plant, and in which at least a part of the driving medium delivered by the compressor flows through this intermediate space as cooling medium.

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1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale.*

